In the Claims:

Claims 1-2. (Cancelled).

3. (Currently Amended) A method for real time hyper-spectral imaging, comprising the steps of:

(a) emitting electromagnetic radiation in a form of an object emission beam, by objects in a scene or a sample, and collimating said object emission beam, using an electromagnetic radiation collimating element, for forming a collimated object emission beam;

(b) receiving and dividing said collimated object emission beam by an optical interferometer, for forming a divided collimated object emission beam having an optical path difference, and for generating an interference image exiting said optical interferometer, wherein said optical interferometer includes:

(i) a beam splitter, onto which said collimated object emission beam is incident, and by which said collimated object emission beam is divided into two beams,

(ii) a fixed mirror operatively positioned relative to said beam splitter,

(iii) a movable mirror operatively positioned relative to said fixed mirror and to said beam splitter, and wherein said fixed mirror and said movable mirror each receives and reflects one of said two beams, such that a difference exists in lengths of optical path traveled by said two beams exiting said optical interferometer, thereby forming said optical path difference,

(iv) a piezoelectric motor, operatively connected to said movable mirror,

(v) a distance change feedback sensor, operatively connected to said movable mirror,

(vi) a piezoelectric motor controller, operatively connected to said piezoelectric motor and to said distance change feedback sensor, and

(vii) an optical interferometer mount, as a mount of said beam splitter, said fixed mirror, said movable mirror, said piezoelectric motor, and said distance change feedback sensor, wherein said optical interferometer mount includes:

(1) a fixed mount section,

(2) a movable mount section,

(3) a mounting location of said beam splitter on said fixed mount section,

(4) a mounting location of said fixed mirror on said fixed mount section,

(5) a mounting location of said movable mirror on said movable mount section,

(6) a mounting location of said piezoelectric motor inside of said fixed mount section, and

(7) a mounting location of said distance change feedback sensor on said fixed mount section;

(c) determining and piezoelectrically changing magnitude of said optical path difference of said divided collimated object emission beam, by said optical interferometer, for generating at least one said interference image for each said magnitude of said optical path difference, including steps of:

(i) displacing said movable mirror along an axis of said divided collimated object emission beam by said piezoelectric motor,

(ii) sensing and measuring change in distance of said movable mirror along said axis by said distance change feedback sensor, and

(iii) actuating and controlling said piezoelectric motor by said piezoelectric motor controller; and

(d) focusing and recording each said generated interference image associated with a corresponding said magnitude of said optical path difference, for forming a plurality of recorded interference images.

4. (Previously Presented) The method of claim 3, wherein step (a) said objects inherently emit said electromagnetic radiation of said object emission beam as a result of inherent body thermal heat emitted by said objects.

5. (Previously Presented) The method of claim 3, wherein step (a) said objects emit said electromagnetic radiation of said object emission beam as a result of excitation by incident electromagnetic radiation supplied by an external source radiating said incident electromagnetic radiation upon said objects.

6. (Previously Presented) The method of claim 5, wherein said incident electromagnetic radiation is in a form of light selected from the group consisting of polychromatic light, monochromatic light, poly- or multi-monochromatic light, and, combinations thereof.

7. (Previously Presented) The method of claim 3, wherein step (b) includes the steps of:

(i) passing a first part of said collimated object emission beam through said beam splitter and onto said fixed mirror, while reflecting a second part of said collimated beam off said beam splitter and onto said movable mirror, and

(ii) reflecting said first part of said collimated object emission beam off said fixed mirror, onto and off said beam splitter, for forming a first exiting beam exiting said optical interferometer, while reflecting and passing said second part of said collimated object emission beam off said movable mirror and through said beam splitter, respectively, for forming a second exiting beam exiting said optical interferometer together with said first exiting beam, thereby generating said interference image.

8. (Previously Presented) The method of claim 3, wherein step (b) includes the steps of:

(i) passing a first part of said collimated object emission beam through said beam splitter and onto said movable mirror, while reflecting a second part of said collimated beam off said beam splitter and onto said fixed mirror, and

(ii) reflecting said first part of said collimated object emission beam off said movable mirror, onto and off said beam splitter, for forming a first exiting beam exiting said optical interferometer, while reflecting and passing said second part

of said collimated object emission beam off said fixed mirror and through said beam splitter, respectively, for forming a second exiting beam exiting said optical interferometer together with said first exiting beam, thereby generating said interference image.

9. (Previously Presented) The method of claim 3, wherein step (c) extent of said piezoelectrically changing said magnitude of said optical path difference of said divided collimated object emission beam along said axis is in a range of from about zero wavelengths to about ten wavelengths of said divided collimated object emission beam.

10. (Previously Presented) The method of claim 3, wherein step (c) maximum of said magnitude of said optical path difference of said divided collimated object emission beam is on order of ten wavelengths of said divided collimated object emission beam.

11. (Previously Presented) The method of claim 3, wherein said piezoelectric motor controller operates as a closed loop controller of said change in distance of said movable mirror along said axis.

12. (Previously Presented) The method of claim 3, wherein said piezoelectric motor controller operates by applying AC voltage or current to said distance change feedback sensor.

13. (Previously Presented) The method of claim 12, wherein said AC voltage is generated by a stable sinusoidal signal generator stabilized by an amplitude stabilizer.

14. (Previously Presented) The method of claim 3, wherein said distance change feedback sensor is in a form of a capacitor sensor, including a capacitor having two plates, and being configured such that a first plate of said capacitor is connected to said movable mirror, and a second plate of said capacitor is connected to said optical interferometer mount.

15. (Previously Presented) The method of claim 14, wherein distance of said movable mirror along said axis changes via actuation and operation of said piezoelectric motor, such that distance between said two plates of said capacitor changes, causing a

change in capacity concurrent with a change in potential difference existing between said two capacitor plates.

16. (Previously Presented) The method of claim 15, wherein said potential difference existing between said two capacitor plates of said distance change feedback sensor is measured by said piezoelectric motor controller.

17. (Previously Presented) The method of claim 16, wherein step (c) said actuating and controlling said piezoelectric motor by said piezoelectric motor controller is performed according to said measurement of said potential difference, and according to a required change in said distance of said movable mirror along said axis received by said piezoelectric motor controller in a form of a command sent by a signal processing unit operatively connected to said piezoelectric motor controller.

18. (Previously Presented) The method of claim 3, wherein step (c) further includes a calibration procedure for calibrating changes in said magnitude of said optical path difference of said divided collimated object emission beam, and for calibrating said magnitude of said optical path difference of said divided collimated object emission beam.

19. (Previously Presented) The method of claim 15, wherein step (c) further includes a calibration procedure for calibrating changes in said magnitude of said optical path difference of said divided collimated object emission beam, and for calibrating said magnitude of said optical path difference of said divided collimated object emission beam.

20. (Previously Presented) The method of claim 19, wherein said calibration procedure includes measuring and generating calibration values of a relationship between said potential difference existing between said two capacitor plates of said distance change feedback sensor and said optical path difference of said divided collimated object emission beam, for actuating a said change in said distance of said movable mirror along said axis.

21. (Previously Presented) The method of claim 3, wherein step (d) each said interference image is focused by camera optics.

22. (Previously Presented) The method of claim 21, wherein electromagnetic radiation within a particular spectral region of interest of each said interference image

exiting said optical interferometer is additionally focused by an electromagnetic radiation filter placed before said camera optics.

23. (Previously Presented) The method of claim 3, further comprising the step of:

(e) mathematically improving quality of said plurality of recorded interference images, via a central programming and control/data/information signal processing unit, for forming a plurality of improved quality interference images, wherein results thereof are stored in a database.

24. (Previously Presented) The method of claim 23, wherein step (e) includes the step of: filtering out noise from said plurality of recorded interference images, by passing said plurality of recorded interference images through a noise reduction filter, via said central programming and control/data/information signal processing unit, wherein results thereof are stored in said database.

25. (Previously Presented) The method of claim 23, wherein step (e) includes the step of: correcting distortions of specific spatial frequencies of said recorded interference images, due to imperfections in construction and/or operation of said optical interferometer, by using a spatial frequency distortion correction look-up table, via said central programming and control/data/information signal processing unit, wherein results thereof are stored in said database.

26. (Previously Presented) The method of claim 23, wherein step (e) includes the step of: correcting dynamic imaging errors associated with successively recording each said generated interference image, resulting from movements of line-of-sight during the hyper-spectral imaging, by applying a translation correction procedure to said plurality of recorded interference images, via said central programming and control/data/information signal processing unit, wherein results thereof are stored in said database.

27. (Previously Presented) The method of claim 23, wherein step (e) includes the step of: improving resolution of said plurality of recorded interference images, by using an image resolution improvement procedure, via said central programming and control/data/information signal processing unit, wherein results thereof are stored in said database.

28. (Previously Presented) The method of claim 3, wherein a plurality of said generated interference images, each featuring a slightly different said magnitude of said optical path difference, is obtained by modulating said piezoelectric motor while performing step (d), of recording a plurality of at least twenty, and up to about five-hundred, said generated interference images for each said change in said magnitude of said optical path difference.

29. (Previously Presented) The method of claim 23, further comprising the step of:

(f) transforming each of said plurality of improved quality interference images from time domain to frequency domain, via said central programming and control/data/information signal processing unit, for forming a corresponding plurality of interferogram images, wherein results thereof are stored in said database.

30. (Previously Presented) The method of claim 29, wherein said transforming is performed by using a Fast-Fourier-Transform procedure, via said central programming and control/data/information signal processing unit, wherein results thereof are stored in said database.

31. (Previously Presented) The method of claim 29, wherein said plurality of interferogram images are used for synthesizing and analyzing three-dimensional hyper-spectral cube images, via said central programming and control/data/information signal processing unit, wherein results thereof are stored in said database.

32. (Previously Presented) The method of claim 29, further comprising the step of:

(g) improving quality of each of said plurality of interferogram images by mathematically increasing maximum of said magnitude of said optical path difference, via said central programming and control/data/information signal processing unit, for forming a plurality of improved quality interferogram images, wherein results thereof are stored in said database.

33. (Previously Presented) The method of claim 32, wherein step (g) said plurality of interferogram images is deconvolutioned using a sinc function, [sin (x) / x],

via said central programming and control/data/information signal processing unit, wherein results thereof are stored in said database.

34. (Previously Presented) The method of claim 32, wherein step (g) said plurality of interferogram images is deconvolutioned using a $(\text{sinc})^2$ function, via said central programming and control/data/information signal processing unit, wherein results thereof are stored in said database.

35. (Previously Presented) The method of claim 32, further comprising the step of:

(h) correcting phase of pixels in each of said plurality of improved quality interferogram images, via said central programming and control/data/information signal processing unit, for forming a plurality of phase corrected improved quality interferogram images, wherein results thereof are stored in said database.

36. (Previously Presented) The method of claim 35, further comprising the step of:

(i) transforming each of said plurality of phase corrected improved quality interferogram images, from wave number units to uniformly dispersed wavelength units, via said central programming and control/data/information signal processing unit, for forming a synthesized hyper-spectral cube image, wherein results thereof are stored in said database.

37. (Previously Presented) The method of claim 36, further comprising the step of:

(j) analyzing a plurality of said synthesized hyper-spectral cube images, by applying a pattern recognition and classification type of image analysis algorithm, via said central programming and control/data/information signal processing unit, wherein results thereof are stored in said database.

38. (Currently Amended) A method for real time dividing a collimated object emission beam of electromagnetic radiation emitted by objects in a scene or a sample, and, determining and piezoelectrically changing the magnitude of an optical path difference of

the divided collimated object emission beam thereof, by an optical interferometer, comprising the steps of:

(a) receiving and dividing the collimated object emission beam by the optical interferometer, for forming the divided collimated object emission beam having the optical path difference, wherein the optical interferometer includes:

(i) a beam splitter, onto which the collimated object emission beam is incident, and by which the collimated object emission beam is divided into two beams,

(ii) a fixed mirror operatively positioned relative to said beam splitter,

(iii) a movable mirror operatively positioned relative to said fixed mirror and to said beam splitter, and wherein said fixed mirror and said movable mirror each receives and reflects one of said two beams, such that a difference exists in lengths of optical path traveled by said two beams exiting the optical interferometer, thereby forming the optical path difference,

(iv) a piezoelectric motor, operatively connected to said movable mirror,

(v) a distance change feedback sensor, operatively connected to said movable mirror,

(vi) a piezoelectric motor controller, operatively connected to said piezoelectric motor and to said distance change feedback sensor, and

(vii) an optical interferometer mount, as a mount of said beam splitter, said fixed mirror, said movable mirror, said piezoelectric motor, and said distance change feedback sensor, wherein said optical interferometer mount includes:

(1) a fixed mount section,

(2) a movable mount section,

(3) a mounting location of said beam splitter on said fixed mount section,

(4) a mounting location of said fixed mirror on said fixed mount section,

(5) a mounting location of said movable mirror on said movable mount section,

(6) a mounting location of said piezoelectric motor inside of said fixed mount section, and

(7) a mounting location of said distance change feedback sensor on said fixed mount section;

(b) displacing said movable mirror along an axis of the divided collimated object emission beam by said piezoelectric motor;

(c) sensing and measuring change in distance of said movable mirror along said axis by said distance change feedback sensor; and

(d) actuating and controlling said piezoelectric motor by said piezoelectric motor controller.

39. (Previously Presented) The method of claim 38, wherein the objects inherently emit the electromagnetic radiation of the object emission beam as a result of inherent body thermal heat emitted by the objects.

40. (Previously Presented) The method of claim 38, wherein the objects emit the electromagnetic radiation of the object emission beam as a result of excitation by incident electromagnetic radiation supplied by an external source radiating incident electromagnetic radiation upon the objects.

41. (Previously Presented) The method of claim 40, wherein said incident electromagnetic radiation is in a form of light selected from the group consisting of polychromatic light, monochromatic light, poly- or multi-monochromatic light, and, combinations thereof.

42. (Previously Presented) The method of claim 38, wherein step (a) includes the steps of:

(i) passing a first part of the collimated object emission beam through said beam splitter and onto said fixed mirror, while reflecting a second part of the collimated beam off said beam splitter and onto said movable mirror, and

(ii) reflecting said first part of the collimated object emission beam off said fixed mirror, onto and off said beam splitter, for forming a first exiting beam exiting the optical

interferometer, while reflecting and passing said second part of the collimated object emission beam off said movable mirror and through said beam splitter, respectively, for forming a second exiting beam exiting the optical interferometer together with said first exiting beam, thereby generating an interference image.

43. (Previously Presented) The method of claim 38, wherein step (a) includes the steps of:

(i) passing a first part of the collimated object emission beam through said beam splitter and onto said movable mirror, while reflecting a second part of the collimated beam off said beam splitter and onto said fixed mirror, and

(ii) reflecting said first part of the collimated object emission beam off said movable mirror, onto and off said beam splitter, for forming a first exiting beam exiting the optical interferometer, while reflecting and passing said second part of the collimated object emission beam off said fixed mirror and through said beam splitter, respectively, for forming a second exiting beam exiting the optical interferometer together with said first exiting beam, thereby generating an interference image.

44. (Previously Presented) The method of claim 38, wherein extent of the piezoelectrically changing the magnitude of the optical path difference of the divided collimated object emission beam along said axis is in a range of from about zero wavelengths to about ten wavelengths of the divided collimated object emission beam.

45. (Previously Presented) The method of claim 38, wherein maximum magnitude of the optical path difference of the divided collimated object emission beam is on order of ten wavelengths of the divided collimated object emission beam.

46. (Previously Presented) The method of claim 38, wherein said piezoelectric motor controller operates as a closed loop controller of said change in distance of said movable mirror along said axis.

47. (Previously Presented) The method of claim 38, wherein said piezoelectric motor controller operates by applying AC voltage or current to said distance change feedback sensor.

48. (Previously Presented) The method of claim 47, wherein said AC voltage is generated by a stable sinusoidal signal generator stabilized by an amplitude stabilizer.

49. (Previously Presented) The method of claim 38, wherein said distance change feedback sensor is in a form of a capacitor sensor, including a capacitor having two plates, and being configured such that a first plate of said capacitor is connected to said movable mirror, and a second plate of said capacitor is connected to said optical interferometer mount.

50. (Previously Presented) The method of claim 49, wherein distance of said movable mirror along said axis changes via actuation and operation of said piezoelectric motor, such that distance between said two plates of said capacitor changes, causing a change in capacity concurrent with a change in potential difference existing between said two capacitor plates.

51. (Previously Presented) The method of claim 50, wherein said potential difference existing between said two capacitor plates of said distance change feedback sensor is measured by said piezoelectric motor controller.

52. (Previously Presented) The method of claim 51, wherein step (d) said actuating and controlling said piezoelectric motor by said piezoelectric motor controller is performed according to said measurement of said potential difference, and according to a required change in said distance of said movable mirror along said axis received by said piezoelectric motor controller in a form of a command sent by a signal processing unit operatively connected to said piezoelectric motor controller.

53. (Previously Presented) The method of claim 38, further including a calibration procedure for calibrating changes in the magnitude of the optical path difference of the divided collimated object emission beam, and for calibrating the magnitude of the optical path difference of the divided collimated object emission beam.

54. (Previously Presented) The method of claim 50, further including a calibration procedure for calibrating changes in the magnitude of the optical path difference of the divided collimated object emission beam, and for calibrating the magnitude of the optical path difference of the divided collimated object emission beam.

55. (Previously Presented) The method of claim 54, wherein said calibration procedure includes measuring and generating calibration values of a relationship between said potential difference existing between said two capacitor plates of said distance change feedback sensor and the optical path difference of the divided collimated object emission beam, for actuating a said change in said distance of said movable mirror along said axis.

56. (Currently Amended) A system for real time hyper-spectral imaging, comprising:

(a) an electromagnetic radiation collimating element, for collimating electromagnetic radiation emitted by objects in a scene or a sample, for forming a collimated object emission beam;

(b) an optical interferometer, for receiving and dividing said collimated object emission beam, for forming a divided collimated object emission beam having an optical path difference, and for generating an interference image exiting said optical interferometer, said optical interferometer includes:

(i) a beam splitter, onto which said collimated object emission beam is incident, and by which said collimated object emission beam is divided into two beams,

(ii) a fixed mirror operatively positioned relative to said beam splitter,

(iii) a movable mirror operatively positioned relative to said fixed mirror and to said beam splitter, and wherein said fixed mirror and said movable mirror each receives and reflects one of said two beams, such that a difference exists in lengths of optical path traveled by said two beams exiting said optical interferometer, thereby forming said optical path difference,

(iv) a piezoelectric motor, operatively connected to said movable mirror,

(v) a distance change feedback sensor, operatively connected to said movable mirror,

(vi) a piezoelectric motor controller, operatively connected to said piezoelectric motor and to said distance change feedback sensor, and

(vii) an optical interferometer mount, as a mount of said beam splitter, said fixed mirror, said movable mirror, said piezoelectric motor, and said distance change feedback sensor, wherein said optical interferometer mount includes:

(1) a fixed mount section,

(2) a movable mount section,

(3) a mounting location of said beam splitter on said fixed mount section,

(4) a mounting location of said fixed mirror on said fixed mount section,

(5) a mounting location of said movable mirror on said movable mount section,

(6) a mounting location of said piezoelectric motor inside of said fixed mount section, and

(7) a mounting location of said distance change feedback sensor on said fixed mount section;

wherein said optical interferometer determines and piezoelectrically changes magnitude of said optical path difference of said divided collimated object emission beam, for generating at least one said interference image for each said magnitude of said optical path difference, by the steps of:

(i) displacing said movable mirror along an axis of said divided collimated object emission beam by said piezoelectric motor,

(ii) sensing and measuring change in distance of said movable mirror along said axis by said distance change feedback sensor, and

(iii) actuating and controlling said piezoelectric motor by said piezoelectric motor controller;

(c) camera optics, for focusing each said generated interference image associated with a corresponding said magnitude of optical path difference; and

(d) a detector, for recording each said generated interference image, for forming a plurality of recorded interference images.

57. (Previously Presented) The system of claim 56, wherein said objects inherently emit said electromagnetic radiation of said object emission beam as a result of inherent body thermal heat emitted by said objects.

58. (Previously Presented) The system of claim 56, wherein said objects emit said electromagnetic radiation of said object emission beam as a result of excitation by incident electromagnetic radiation supplied by an external source radiating said incident electromagnetic radiation upon said objects.

59. (Previously Presented) The system of claim 58, wherein said incident electromagnetic radiation is in a form of light selected from the group consisting of polychromatic light, monochromatic light, poly- or multi-monochromatic light, and, combinations thereof.

60. (Previously Presented) The system of claim 56, wherein said beam splitter is selected from the group consisting of a rectangular shaped beam splitter and a cubic shaped beam splitter.

61. (Previously Presented) The system of claim 56, wherein extent of said piezoelectrically changing said magnitude of said optical path difference of said divided collimated object emission beam along said axis is in a range of from about zero wavelengths to about ten wavelengths of said divided collimated object emission beam.

62. (Previously Presented) The system of claim 56, wherein maximum of said magnitude of said optical path difference of said divided collimated object emission beam is on order of ten wavelengths of said object emission beam.

63. (Previously Presented) The system of claim 56, wherein said piezoelectric motor controller operates as a closed loop controller of said change in distance of said movable mirror along said axis.

64. (Previously Presented) The system of claim 56, wherein said piezoelectric motor controller operates by applying AC voltage or current to said distance change feedback sensor.

65. (Previously Presented) The system of claim 64, wherein said AC voltage is generated by a stable sinusoidal signal generator stabilized by an amplitude stabilizer.

66. (Previously Presented) The system of claim 56, wherein said distance change feedback sensor is in a form of a capacitor sensor, including a capacitor having two plates, and being configured such that a first plate of said capacitor is connected to said movable mirror, and a second plate of said capacitor is connected to said optical interferometer mount.

67. (Previously Presented) The system of claim 66, wherein distance of said movable mirror along said axis changes via actuation and operation of said piezoelectric motor, such that distance between said two plates of said capacitor changes, causing a change in capacity concurrent with a change in potential difference existing between said two capacitor plates.

68. (Previously Presented) The system of claim 67, wherein said potential difference existing between said two capacitor plates of said distance change feedback sensor is measured by said piezoelectric motor controller.

69. (Previously Presented) The system of claim 68, wherein said actuating and controlling said piezoelectric motor by said piezoelectric motor controller is performed according to said measurement of said potential difference, and according to a required change in said distance of said movable mirror along said axis received by said piezoelectric motor controller in a form of a command sent by a signal processing unit operatively connected to said piezoelectric motor controller.

70. (Previously Presented) The system of claim 56, wherein said optical interferometer is used for performing a calibration procedure for calibrating changes in said magnitude of said optical path difference of said divided collimated object emission beam, and for calibrating said magnitude of said optical path difference of said divided collimated object emission beam, as part of said determining and piezoelectrically changing said magnitude of said optical path difference.

71. (Previously Presented) The system of claim 67, wherein said optical interferometer is used for performing a calibration procedure for calibrating changes in said magnitude of said optical path difference of said divided collimated object emission

beam, and for calibrating said magnitude of said optical path difference of said divided collimated object emission beam, as part of said determining and piezoelectrically changing said magnitude of said optical path difference.

72. (Previously Presented) The system of claim 71, wherein said calibration procedure includes measuring and generating calibration values of a relationship between said potential difference existing between said two capacitor plates of said distance change feedback sensor and said optical path difference of said divided collimated object emission beam, for actuating a said change in said distance of said movable mirror along said axis.

73. (Previously Presented) The system of claim 56, wherein an electromagnetic radiation filter is placed before said camera optics, for additionally focusing electromagnetic radiation within a particular spectral region of interest of each said interference image exiting said optical interferometer.

74. (Cancelled).

75. (Currently Amended) The system of claim ~~74~~ 56, wherein said optical interferometer mount further includes:

(8) a plurality of spring or spring-like motion/direction stabilizing elements, operatively connected to said fixed mount section and operatively connected to said movable mount section, for stabilizing motion and/or direction of said movable mount section and of said movable mirror during the real time hyper-spectral imaging.

76. (Previously Presented) The system of claim 56, wherein said optical interferometer mount is of a three dimensional curvilinear structure selected from the group consisting of a complex structure including a combination of at least two separate structures, and, an integral structure including a single structure or an integral combination of said at least two separate structures.

77. (Previously Presented) The system of claim 56, wherein said optical interferometer mount has a coefficient of thermal expansion of less than about 1.0 x 10 ^ -4 / °K, thereby exhibiting high rigidity, high dimensional stability, extremely low thermal expansion, and extremely low mechanical sensitivity to temperature changes, during the

real time hyper-spectral imaging, for reducing dependency of said optical path difference of said divided collimated object emission beam, and changes thereof, on said temperature changes.

78. (Previously Presented) The system of claim 56, wherein said optical interferometer mount has a coefficient of thermal expansion of less than about 1.0 x 10 ^ -5 / °K, thereby exhibiting high rigidity, high dimensional stability, extremely low thermal expansion, and extremely low mechanical sensitivity to temperature changes, during the real time hyper-spectral imaging, for reducing dependency of said optical path difference of said divided collimated object emission beam, and changes thereof, on said temperature changes.

79. (Previously Presented) The system of claim 56, wherein said optical interferometer mount has a coefficient of thermal expansion of on order of about 1.0 x 10 ^ -6 / °K, thereby exhibiting high rigidity, high dimensional stability, extremely low thermal expansion, and extremely low mechanical sensitivity to temperature changes, during the real time hyper-spectral imaging, for reducing dependency of said optical path difference of said divided collimated object emission beam, and changes thereof, on said temperature changes.

80. (Previously Presented) The system of claim 56, wherein said optical interferometer mount is made of an alloy or mixed metallic type of material being a stainless steel alloy including at least one metal selected from the group consisting of nickel and cobalt, wherein said material has a coefficient of thermal expansion of less than about 1.0 x 10 ^ -4 / °K.

81. (Previously Presented) The system of claim 56, wherein said optical interferometer mount is made of an alloy or mixed metallic type of material being a stainless steel alloy selected from the group consisting of a stainless steel alloy including about 36 % nickel, a stainless steel alloy including stainless steel and about 36 % nickel, a stainless steel alloy including about 36 % nickel and up to about 5 % cobalt, and, a stainless steel alloy including steel, about 36 % nickel, and up to about 5 % cobalt, wherein said material has a coefficient of thermal expansion of less than about 1.0 x 10 ^ -5 / °K.

82. (Previously Presented) The system of claim 56, wherein said optical interferometer mount is made of an alloy or mixed metallic type of material being a steel

alloy selected from the group consisting of an INVAR steel alloy, and an INVAR type of steel alloy, wherein said material has a coefficient of thermal expansion of on order of about 1.0 x 10 ^ -6 / °K.

83. (Previously Presented) The system of claim 56, wherein said optical interferometer mount is made of an alloy or mixed metallic type of material being a stainless steel alloy selected from the group consisting of an INVAR stainless steel alloy, and an INVAR type of stainless steel alloy, wherein said material has a coefficient of thermal expansion of on order of about 1.0 x 10 ^ -6 / °K.

84. (Previously Presented) The system of claim 83, wherein said INVAR is high purity INVAR 36, including a carbon content of less than about 0.01 %.

85. (Previously Presented) The system of claim 56, wherein said optical interferometer mount is made of a solid non-metallic type of material selected from the group consisting of quartzes, glasses, ceramics, and glass ceramics.

86. (Currently Amended) An optical interferometer for real time dividing a collimated object emission beam of electromagnetic radiation emitted by objects in a scene or a sample, and, determining and piezoelectrically changing the magnitude of an optical path difference of the divided collimated object emission beam thereof, comprising:

(a) a beam splitter, onto which the collimated object emission beam is incident, and by which the collimated object emission beam is divided into two beams;

(b) a fixed mirror operatively positioned relative to said beam splitter;

(c) a movable mirror operatively positioned relative to said fixed mirror and to said beam splitter, and wherein said fixed mirror and said movable mirror each receives and reflects one of said two beams, such that a difference exists in lengths of optical path traveled by said two beams exiting the optical interferometer, thereby forming the optical path difference;

(d) a piezoelectric motor, operatively connected to said movable mirror, for displacing said movable mirror along an axis of the divided collimated object emission beam;

(e) a distance change feedback sensor, operatively connected to said movable mirror, for sensing and measuring change in distance of said movable mirror along said axis;

(f) a piezoelectric motor controller, operatively connected to said piezoelectric motor and to said distance change feedback sensor, for actuating and controlling said piezoelectric motor; and

(g) an optical interferometer mount, as a mount of said beam splitter, said fixed mirror, said movable mirror, said piezoelectric motor, and said distance change feedback sensor, wherein said optical interferometer mount includes:

(i) a fixed mount section,

(ii) a movable mount section,

(iii) a mounting location of said beam splitter on said fixed mount section,

(iv) a mounting location of said fixed mirror on said fixed mount section,

(v) a mounting location of said movable mirror on said movable mount section,

(vi) a mounting location of said piezoelectric motor inside of said fixed mount section, and

(vii) a mounting location of said distance change feedback sensor on said fixed mount section.

87. (Previously Presented) The optical interferometer of claim 86, wherein said beam splitter is selected from the group consisting of a rectangular shaped beam splitter and a cubic shaped beam splitter.

88. (Previously Presented) The optical interferometer of claim 86, wherein extent of the piezoelectrically changing the magnitude of the optical path difference of the divided collimated object emission beam along said axis is in a range of from about zero wavelengths to about ten wavelengths of the divided collimated object emission beam.

89. (Previously Presented) The optical interferometer of claim 86, wherein maximum of the magnitude of the optical path difference of the divided collimated object emission beam is on order of ten wavelengths of the divided collimated object emission beam.

90. (Previously Presented) The optical interferometer of claim 86, wherein said piezoelectric motor controller operates as a closed loop controller of said change in distance of said movable mirror along said axis.

91. (Previously Presented) The optical interferometer of claim 86, wherein said piezoelectric motor controller operates by applying AC voltage or current to said distance change feedback sensor.

92. (Previously Presented) The optical interferometer of claim 91, wherein said AC voltage is generated by a stable sinusoidal signal generator stabilized by an amplitude stabilizer.

93. (Previously Presented) The optical interferometer of claim 86, wherein said distance change feedback sensor is in a form of a capacitor sensor, including a capacitor having two plates, and being configured such that a first plate of said capacitor is connected to said movable mirror, and a second plate of said capacitor is connected to said optical interferometer mount.

94. (Previously Presented) The optical interferometer of claim 93, wherein distance of said movable mirror along said axis changes via actuation and operation of said piezoelectric motor, such that distance between said two plates of said capacitor changes, causing a change in capacity concurrent with a change in potential difference existing between said two capacitor plates.

95. (Previously Presented) The optical interferometer of claim 94, wherein said potential difference existing between said two capacitor plates of said distance change feedback sensor is measured by said piezoelectric motor controller.

96. (Previously Presented) The optical interferometer of claim 95, wherein said actuating and controlling said piezoelectric motor by said piezoelectric motor controller is performed according to said measurement of said potential difference, and according to a required change in said distance of said movable mirror along said axis received by said piezoelectric motor controller in a form of a command sent by a signal processing unit operatively connected to said piezoelectric motor controller.

97. (Previously Presented) The optical interferometer of claim 86, wherein the optical interferometer is used for performing a calibration procedure for calibrating changes in the magnitude of the optical path difference of the divided collimated object emission beam, and for calibrating the magnitude of the optical path difference of the divided collimated object emission beam.

98. (Previously Presented) The optical interferometer of claim 94, wherein the optical interferometer is used for performing a calibration procedure for calibrating changes in the magnitude of the optical path difference of the divided collimated object emission beam, and for calibrating the magnitude of the optical path difference of the divided collimated object emission beam.

99. (Previously Presented) The optical interferometer of claim 98, wherein said calibration procedure includes measuring and generating calibration values of a relationship between said potential difference existing between said two capacitor plates of said distance change feedback sensor and the optical path difference of the divided collimated object emission beam, for actuating a said change in said distance of said movable mirror along said axis.

100. (Cancelled).

101. (Currently Amended) The optical interferometer of claim ~~100~~ 86, wherein said optical interferometer mount further includes:

(viii) a plurality of spring or spring-like motion/direction stabilizing elements, operatively connected to said fixed mount section and operatively connected to said movable mount section, for stabilizing motion and/or direction of said movable mount section and of said movable mirror.

102. (Previously Presented) The optical interferometer of claim 86, wherein said optical interferometer mount is of a three dimensional curvilinear structure selected from the group consisting of a complex structure including a combination of at least two separate structures, and, an integral structure including a single structure or an integral combination of said at least two separate structures.

103. (Previously Presented) The optical interferometer of claim 86, wherein said optical interferometer mount has a coefficient of thermal expansion of less than about 1.0 x 10 ^ -4 / °K, thereby exhibiting high rigidity, high dimensional stability, extremely low thermal expansion, and extremely low mechanical sensitivity to temperature changes, for reducing dependency of the optical path difference of the divided collimated object emission beam, and changes thereof, on said temperature changes.

104. (Previously Presented) The optical interferometer of claim 86, wherein said optical interferometer mount has a coefficient of thermal expansion of less than about 1.0 x 10 ^ -5 / °K, thereby exhibiting high rigidity, high dimensional stability, extremely low thermal expansion, and extremely low mechanical sensitivity to temperature changes, for reducing dependency of the optical path difference of the divided collimated object emission beam, and changes thereof, on said temperature changes.

105. (Previously Presented) The optical interferometer of claim 86, wherein said optical interferometer mount has a coefficient of thermal expansion of on order of about 1.0 x 10 ^ -6 / °K, thereby exhibiting high rigidity, high dimensional stability, extremely low thermal expansion, and extremely low mechanical sensitivity to temperature changes, for reducing dependency of the optical path difference of the divided collimated object emission beam, and changes thereof, on said temperature changes.

106. (Previously Presented) The optical interferometer of claim 86, wherein said optical interferometer mount is made of an alloy or mixed metallic type of material being a stainless steel alloy including at least one metal selected from the group consisting of nickel and cobalt, wherein said material has a coefficient of thermal expansion of less than about 1.0 x 10 ^ -4 / °K.

107. (Previously Presented) The optical interferometer of claim 86, wherein said optical interferometer mount is made of an alloy or mixed metallic type of material being a stainless steel alloy selected from the group consisting of a stainless steel alloy including about 36 % nickel, a stainless steel alloy including stainless steel and about 36 % nickel, a stainless steel alloy including about 36 % nickel and up to about 5 % cobalt, and, a stainless steel alloy including steel, about 36 % nickel, and up to about 5 % cobalt, wherein said material has a coefficient of thermal expansion of less than about 1.0 x 10 ^ -5 / °K.

108. (Previously Presented) The optical interferometer of claim 86, wherein said optical interferometer mount is made of an alloy or mixed metallic type of material being a steel alloy selected from the group consisting of an INVAR steel alloy, and an INVAR type of steel alloy, wherein said material has a coefficient of thermal expansion of on order of about 1.0 x 10 ^ -6 / °K.

109. (Previously Presented) The optical interferometer of claim 86, wherein said optical interferometer mount is made of an alloy or mixed metallic type of material being a stainless steel alloy selected from the group consisting of an INVAR stainless steel alloy, and an INVAR type of stainless steel alloy, wherein said material has a coefficient of thermal expansion of on order of about 1.0 x 10 ^ -6 / °K.

110. (Previously Presented) The optical interferometer of claim 109, wherein said INVAR is high purity INVAR 36, including a carbon content of less than about 0.01 %.

111. (Previously Presented) The optical interferometer of claim 86, wherein said optical interferometer mount is made of a solid non-metallic type of material selected from the group consisting of quartzes, glasses, ceramics, and glass ceramics.